

STUDIES IN THE OAKS OF THE MOUNTAINS OF NORTHEASTERN MEXICO

CORNELIUS H. MUELLER

IN TWO collections of plants made for the Arnold Arboretum in the mountains of Nuevo Leon, Mexico, by the author and Mary Taylor Mueller in 1934 and by the author in 1935 there are 250 numbers of oaks. A field study of considerable intensity from about May 6 to August 15, 1934 and from June 22 to August 15, 1935 has been supplemented by an herbarium study of the specimens collected.

The collecting and field study were carried on in the Sierra Madre Oriental south of Monterrey, Nuevo Leon. The localities cited in the treatment of the species are based upon names appearing on the topographic maps of the republic published by the *Secretaria de Agricultura y Fomento, Departamento de Geografía, Meteorología e Hidrología, Tacubaya, D. F., Mexico*. The maps are known as "*Carta de la República Mexicana en hojas a là 100,000^a*." Many of the names of ranches and cañons are local names not appearing on any maps. The term *municipio* (Mun.) refers to a political unit comparable to a county. A *municipio* takes its name from the town in which the seat of government is located.

In many of the species there was noted a high degree of variability which undoubtedly has in part led to the description of numerous poorly distinguished species. It will be noted that there are proposed many new names for forms not identical with, but surely conspecific with, previously known entities. These are given the rank of *forma* merely to call attention simultaneously to their differences from, and their conspecificity with, the typical forms with which they are allied, in the hope of avoiding their being regarded as distinct species, as they might readily be if one had not the intergrading forms to study and could not see the trees in the field.

The types of the new species and forms are deposited in the herbarium of the Arnold Arboretum (cited A. A.), Harvard University. The author wishes to acknowledge the excellent coöperation and financial aid of the Arboretum which made possible the collection of these plants.

Subgenus LEUCOBALANUS Engelmänn

Series POLYMORPHAE Trelease

Quercus polymorpha Chamisso & Schlechtendal in *Linnaea*, **5**: 78 (1830).

NUEVO LEON: Mun. de Monterrey, Cañon Diente, alt. 700 to 1000 m., common on the wooded cañon floor and adjacent slopes, *No.* 252, May 6, 1934; Mun. de Galeana, cañon below Alamar on Hacienda Pablillo, common on the densely wooded cañon floor, alt. 1900 m., *Nos.* 608 & 609, May 29, 1934, *No.* 632, May 30, 1934, *No.* 1143, July 21, 1934.

Quercus polymorpha f. *angustifolia*, f. nov.

A typo recedit foliis anguste lanceolatis (3–4 × 10–14 cm.) integris vel versus apicem angustatum leviter dentatis, acumine plerumque obtuso.

NUEVO LEON: Mun. de Galeana, cañons about Alamar on Hacienda Pablillo, alt. 2000 m., *No.* 610, May 29, 1934, *No.* 1144 (type in A. A.), July 21, 1934; Mun. de Villa Santiago, arroyo bottom between Las Adjuntas and Potrero Redondo, alt. 1300 m., *No.* 2076, July 3, 1935.

Series GLAUCOIDEAE Trelease

Quercus clivicola Trelease & Mueller in *Bull. Torr. Bot. Club*, **63**: 149 (1936).

NUEVO LEON: Mun. de Galeana, Cañon San Francisco on Hacienda Pablillo, abundant in the pine and oak wood of the cañon floor and slopes, alt. 2000 to 2200 m., *No.* 286, May 10, 1934, *Nos.* 305, 306, & 309, May 11, 1934, *No.* 452, May 18, 1934, *Nos.* 1280, 1285, 1285A, 1286, & 1292, July 31, 1934; common in the oak wood about Taray on Hacienda Pablillo, alt. 2200 m., *No.* 423, May 17, 1934, *No.* 947, July 2, 1934; in Cañon Santa Barbara on Hacienda Pablillo, alt. 2000 m., *No.* 584, May 25, 1934, *Nos.* 1097 & 1098, July 19, 1934; common about Alamar on Hacienda Pablillo, alt. 2000 m., *No.* 974, July 3, 1934, *Nos.* 1103 & 1105, July 20, 1934; Puerto de los Pastores near Galeana, alt. 1500 m., common on openly wooded slopes, *No.* 1007A, July 5, 1934, *No.* 1295, August 2, 1934; Mun. de Monterrey, Cañon Diente, alt. 900 m., common on the wooded cañon floor and slopes, *Nos.* 1306 & 1306B, August 8, 1934; Mun. de Villa Santiago, Cañon Guajuco above Villa Santiago, alt. 1300 m., common on openly wooded slopes, *No.* 1331, August 12, 1934, *No.* 1356, August 15, 1934.

Quercus clivicola f. *consanguinea* C. H. Mueller in *Bull. Torr. Bot. Club*, **63**: 150 (1936).

NUEVO LEON: Mun. de Galeana, Cañon Santa Barbara on Hacienda

Pablillo, alt. 2000 m., common in the pine and oak wood of the cañon walls, *No.* 583, May 25, 1934, *No.* 1096, July 19, 1934; about Alamar on Hacienda Pablillo, alt. 2000 m., scattered in the oak wood of relatively open slopes, *No.* 1104, July 20, 1934; Cañon San Francisco on Hacienda Pablillo, alt. 2100 m., abundant in the pine and oak wood of gentle slopes, *No.* 1285B, July 31, 1934.

Quercus clivicola* f. *crenifolia Trelease & Mueller in Bull. Torr. Bot. Club, **63**: 150 (1936).

NUEVO LEON: Mun. de Galeana, Cañon San Francisco on Hacienda Pablillo, alt. 2100 m., common in open oak wood, *No.* 388, May 14, 1934; about Taray on Hacienda Pablillo, abundant on openly wooded, gentle slopes, alt. 2200 m., *Nos.* 421, 422, & 425, May 17, 1934; near Alamar on Hacienda Pablillo, abundant in open oak wood on gentle slopes, alt. about 2000 m., *No.* 614, May 29, 1934, *No.* 701, June 2, 1934, *No.* 1145, July 21, 1934, *Nos.* 1173 & 1176, July 22, 1934; Mun. de Villa Santiago, Potrero Redondo, alt. 1300 m., sparse in the luxuriant pine wood, *No.* 2128, July 5, 1935.

Quercus clivicola* f. *dentata Trelease & Mueller in Bull. Torr. Bot. Club, **63**: 150 (1936).

NUEVO LEON: Mun. de Galeana, Cañon San Francisco on Hacienda Pablillo, alt. 2100 m., abundant constituent of the pine-oak forest, *No.* 322, May 12, 1934, *Nos.* 1284 & 1284A, July 31, 1934; Cañon Santa Barbara on Hacienda Pablillo, alt. 2200 m., common in the pine-oak wood, *No.* 1093, July 19, 1934; Puerto de los Pastores near Galeana, alt. 1500 m., scattered on dry, openly wooded slopes, *No.* 996, July 5, 1934; Mun. de Linares, Cañon Santa Rosa near Iturbide, alt. about 1200 m., scattered in wooded arroyos, *No.* 1294, August 2, 1934.

Quercus clivicola* f. *elongata, f. nov.

A formis aliis differt foliis magis elongatis (2-3 × 10-12 cm.) plerisque supra crenatis vel dentatis.

NUEVO LEON: Mun. de Villa Santiago, Cañon Guajuco above Villa Santiago, alt. 1300 m., common in the low oak wood, *No.* 1323 (type in A. A.), August 10, 1934; Mun. de Galeana, Taray on Hacienda Pablillo, alt. 2200 m., *No.* 582, May 25, 1934, *No.* 1095, July 19, 1934.

This form is close to both f. *crenifolia* and f. *dentata* in that the leaves are usually crenate or dentate above.

Quercus glaucophylla von Seemen in Bot. Jahrb. **29**: 95 (1900).

NUEVO LEON: Mun. de Galeana, Taray on Hacienda Pablillo, alt. 2200 m., sparse on the openly wooded slopes, *No.* 590, May 29, 1934; near Alamar on Hacienda Pablillo, alt. 2000 m., common on sparsely

wooded, dry slopes, *No.* 596, May 29, 1934, *No.* 1121, July 21, 1934; Puerto de los Pastores near Galeana, alt. 1500 m., scattered on sparsely wooded, dry slopes, *No.* 1002, July 5, 1934.

***Quercus glaucophylla* f. *lobata*, f. nov.**

A formis aliis differt foliis typicis e basi ad apicem profunde lobatis, sinibus plerisque litteram U simulantibus.

NUEVO LEON: Mun. de Galeana, Cañon San Francisco on Hacienda Pablillo, alt. 2100 m., scattered on openly wooded limestone bluffs, *No.* 1281 (type in A. A.), July 31, 1934; Puerto de los Pastores near Galeana, small tree sparse on openly wooded, gentle slopes, *No.* 1003, July 5, 1934.

***Quercus glaucophylla* f. *longifolia*, f. nov.**

Ab aliis formis differt foliis elongatis (1.5–3 × 5–7.5 cm.) supra tantum leviter rotundo-lobatis.

NUEVO LEON: Mun. de Galeana, Taray on Hacienda Pablillo, alt. 2200 m., small tree, sparse in open oak wood on slopes, *No.* 589 (type in A. A.), May 29, 1934.

***Quercus glaucophylla* f. *macropetiolata* C. H. Mueller in Bull. Torr. Bot. Club, 63: 151 (1936).**

In some cases this form has much longer petioles than those first described for it from Monterrey, some of them being as long as 16 mm.

NUEVO LEON: Mun. de Galeana, Cañon San Francisco on Hacienda Pablillo, alt. 2100 m., common on openly wooded slopes, *No.* 307, May 11, 1934; Alamar on Hacienda Pablillo, alt. 2000 m., common on openly wooded, dry slopes, *No.* 1101, July 20, 1934, *No.* 1200, July 23, 1934; Puerto de los Pastores near Galeana, alt. 1500 m., scattered on dry, openly wooded slopes, *No.* 1001, July 5, 1934; Mun. de Villa Santiago, Potrero Redondo, alt. 1300 m., common on steep, openly wooded slopes, *No.* 2087, July 4, 1935.

***Quercus glaucophylla* var. *subrotundifolia*, f. nov.**

A formis aliis differt foliis majoribus (ad 5 × 6 cm.) ovalibus integris vel supra inconspicue crenatis.

NUEVO LEON: Mun. de Galeana, Cañon San Francisco on Hacienda Pablillo, alt. 2100 m., sparse on dry cliffs in the oak wood, *No.* 1282 (type in A. A.), July 31, 1934.

***Quercus verde*, sp. nov.**

Arbor parva ramis gracilibus (1–2 mm.) sulcatis incano-tomentosis, annotinis pubescentibus, lenticellis sparsis minutis vel majusculis conspicuisque; gemmae primum ovoideae et vix 1 mm. diam., demum acute ovoideae ad 2.5 × 3.5 mm. magnae, glabrae; stipulae subulatae, 5 mm.

longae, plerumque persistentes. Folia decidua, oblonga vel obovata, obtusa, saepe mucronulata, leviter cordata, integra vel apicem versus dentibus paucis latis brevibusque mucronulatis, margine minute revoluto plano vel crispo, supra lucidula et sparsissime stellata, subtus pallidiora, pilis stellatis canescentia, venis utrinsecus 8 vel 9 ramosis et anastomosantibus supra non sed subtus manifeste elevatis; petioli circiter 0.5–1 × 5–9 mm., dense stellato-pilosi. Amenta mascula 2.5–3.5 cm. longa, laxa, stellato-pilosa, antheris glabris breviter exsertis; amenta feminea 2–4-flora, pedunculo incano 1–2.5 cm. longo. Fructus annuus, non visus.

NUEVO LEON: Mun. de Galeana, Cañon San Francisco on Hacienda Pablillo, alt. 2100 m., scattered in low oak wood on a hilltop, *No.* 373 (type in A. A.), May 14, 1934, *No.* 451, May 18, 1934; Cieneguillas on Hacienda Pablillo, alt. 2500 m., sparse in scrubby oak wood, *No.* 886, June 17, 1934.

A moderately small tree with rather gnarled branches and scaly gray bark. It occurs infrequently in open oak wood. From all other species of the section GLAUCOIDEAE except *Q. sororia* Liebm. (Overs. Dansk. Vidensk. Selsk. Forhandl. 1854, p. 175) this species differs in having twigs stellately incanous the first year and still quite hairy the second. From *Q. sororia* it differs in its very slender twigs and leaves hairy beneath. Its relationship to any one species in the series is problematic.

× **Quercus pastorensis**, hybr. nov. (*Q. glaucophylla* von Seemen × *Q. clivicola* Trel. & C. H. Muell.).

Ramuli, gemmae et fructus ut in *Q. glaucophylla*; ramuli et folia subtus persistenter pubescentes ut in *Q. clivicola*; folia nervatione *Q. glaucophyllam* referentia, sed textura et forma (oblonga margine crenata) *Q. clivicolae* similia.

NUEVO LEON: Mun. de Galeana, Puerto de los Pastores near Galeana, alt. 1500 m., common on openly wooded, dry slopes, *No.* 1296 (type in A. A.) & 1297, August 2, 1934, *Nos.* 1000 & 1005, July 5, 1934. *Nos.* 1000 & 1297 seem to have resulted from a back cross with *Q. glaucophylla*. In them the characters of *Q. clivicola*, especially the hairiness of the leaves, are somewhat less evident.

Although the parents of this hybrid occur mixed over much of the range covered by this report, as well as in the type locality of the proposed hybrid, nowhere else was there noticed any evidence of hybridization. Since the type locality is a rather poor site bearing little woody vegetation, it may be that the hybrid is in this case less vigorous than the parents and therefore confined to an area in which the rigors of drought have much reduced the competition. It is doubtless true that many of the species reported in Mexico are hybrids which cannot be

recognized as such because of the extremely small amount of field study which has been carried on.

Series AURANTIACAE Trelease

Quercus monterreyensis Trelease & Mueller in Bull. Torr. Bot. Club, **63**: 151 (1936).

NUEVO LEON: Mun. de Monterrey, Cañon Diente, alt. 600 m., sparse in the dense oak wood, *No.* 256, May 6, 1934; Mun. de Villa Santiago, Cañon Guajuco above Villa Santiago, alt. 1300 m., common in rather dense oak wood along arroyos and on slopes, *No.* 1315, August 10, 1934, *Nos.* 1328 & 1329, August 12, 1934; Potrero Redondo, alt. 1300 m., scattered in open oak wood on gentle slopes, *No.* 2080, July 3, 1935.

Of these specimens *No.* 1328 differs considerably from the other specimens in having leaves about half normal size both surfaces of which are sparsely stellate hairy. These differences hardly merit a name even as a form, for they often occur on the same tree as typical leaves and are to be regarded as a part of the normal variation of the species.

Series RETICULATAE Trelease

Quercus reticulata Humboldt & Bonpland, Pl. Aequinoct. **2**: 40 (1809).

NUEVO LEON: Mun. de Galeana, Cañon San Francisco on Hacienda Pablillo, alt. 2100 m., abundant along wooded waterways, *Nos.* 303 & 304, May 11, 1934, *No.* 1279A, July 31, 1934; above Alamar on Hacienda Pablillo, alt. 2300 m., sparse in low oak scrub, *No.* 747, June 4, 1934; Cañon de Cieneguillas above Pueblo San Francisco, alt. 2400 m., scattered along wooded waterways, *Nos.* 1271 & 1272, July 27, 1934.

This polymorphic species is quite difficult to delimit, for there appears to be as much variation within the species as there is between it and some others of the series, notably *Q. rhodophlebia* Trelease (in Mem. Nat. Acad. Sci. **20**: 74. 1924), *Q. Uhdeana* Trelease (l. c. 75), and *Q. pilicaulis* Trelease (l. c. 67).

Quercus reticulata f. **squarrosa** Trelease in Mem. Nat. Acad. Sci. **20**: 75 (1924).

NUEVO LEON: Mun. de Galeana, Cañon San Francisco on Hacienda Pablillo, alt. 2100 m., sparse with the species along arroyos, *No.* 1279, July 31, 1934.

Quercus reticulata f. **longa** Trelease in Mem. Nat. Acad. Sci. **20**: 75 (1924).

NUEVO LEON: Mun. de Galeana, Cañon San Francisco on Hacienda

Pablillo, alt. 2100 m., sparse with the species along arroyos, *No. 1279B*, July 31, 1934.

This form, like the above, is not distinct from the species but grades into it.

***Quercus reticulata* f. *pungens*, f. nov.**

A typo recedit foliis 1.5×3 cm. vel minoribus profunde mucronato-dentatis in dimidio superiore, margine revolutis et manifeste undulatis.

NUEVO LEON: Mun. de Derrumbadero, Cañon de los Capulines above San Enrique on Hacienda San Jose de Raices, alt. 2500 m., shrub, rare on dry, shrub-covered slopes, *No. 2417* (type in A. A.), August 6, 1935.

***Quercus revoluta* Trel.¹ f. *acuta*, f. nov.**

A typo recedit foliis magis elongatis ($1-1.5 \times 2-3.5$ vel 2×5 cm.) apice mucronatis acutissimis, dentatis vel integris, tomento subtus satis sparso.

NUEVO LEON: Mun. de Galeana, Puente de Dios near Galeana, alt. 1200 m., abundant shrub on dry, shrub-covered hills, *No. 2169* (type in A. A.), July 12, 1935.

***Quercus Loeseneri* Trelease in Mem. Nat. Acad. Sci. 20: 79 (1924).**

NUEVO LEON: Mun. de Galeana, slopes about Cieneguillas on Hacienda Pablillo, alt. 2400 m., sparse in the shrubs of the dry hills, *No. 882*, June 17, 1934; Cerro Potosí near Galeana, alt. 2700 to 3300 m., abundant low shrub in the pine forest, *No. 1263*, July 26, 1934, *Nos. 2225 & 2239*, July 20, 1935, *No. 2286*, July 24, 1935.

The distinction of this species from *Q. reticulata* seems very doubtful.

Series MICROPHYLLAE Trelease

***Quercus microphylla* Née in Anal. Cienc. Nat. 3: 264 (1801).**

NUEVO LEON: Mun. de Galeana, Cañon San Francisco on Hacienda Pablillo, alt. 2100 m., sparse shrubs on low-wooded slopes, *Nos. 1291B & 1291X*, July 31, 1934.

The preceding specimens are doubtfully referred to this species.

Probably the most confused group of white oaks and the last which will be satisfactorily understood is comprised of the various scrubby species of the desert mountain areas of northern Mexico and adjacent southwestern United States. One group, which seems to center about *Q. microphylla* and *Q. chihuahuensis* Trel., is represented in these collections by twenty numbers. The specimens show definite affinities to several species, but by reason of their high degree of intergrading can

¹Trelease in Mem. Nat. Acad. Sci. 20: 79 (1924).

only tentatively be referred to any species. It seems apparent that one of two conditions must be recognized. There might be an intricate system of closely related species which would many times multiply the number now known. To follow such an assumption would defeat the purpose of taxonomy. The only alternative which seems at present applicable is that there has been a high incidence of hybridization coupled with the natural variations of a profoundly fluctuating group of organisms. To classify satisfactorily such an entanglement will require field study of literally thousands of specimens and can hardly be undertaken in the study of a limited area such as the one now under consideration.

Series CHIHUAHUENSES Trelease

Quercus chihuahuensis Trelease in Mem. Nat. Acad. Sci. **20**: 85 (1924).

NUEVO LEON: Mun. de Galeana, Cañon San Francisco on Hacienda Pablillo, alt. 2100 m., abundant low shrub on low-wooded slopes, *Nos.* 312 & 320, May 12, 1934, *Nos.* 1036 & 1037, July 15, 1934, *Nos.* 1288, 1288A, 1291, & 1291A, July 31, 1934; about Pablillo on Hacienda Pablillo, alt. 2000 to 2100 m., *Nos.* 535 & 536, May 21, 1934, *No.* 885, June 17, 1934, *No.* 1091, July 18, 1934; above Alamar on Hacienda Pablillo, alt. 2200 m., common low shrub in dry, open wood, *No.* 748, June 4, 1934, *No.* 1158A, July 22, 1934; Cerro Infernillo on Hacienda Pablillo, alt. 3000 m., a common shrub in the pine forest, *No.* 847, June 17, 1934; Cañon de las Placetas above Pueblo San Francisco, alt. 2300 m., abundant as an undergrowth in pine and oak wood, *No.* 1274, July 27, 1934; Cerro Potosí above Derramadero, alt. 2700 m., abundant low or creeping shrub in the pine forest, *No.* 2280, July 22, 1935; Arroyo Hondo near San Enrique on Hacienda San Jose de Raices, abundant on dry, shrub-covered slopes, *No.* 2311, July 31, 1935; Mun. de Villa Santiago, pass above Potrero Redondo, alt. 2100 to 2300 m., abundant in the shrub zones, *No.* 2134, July 7, 1935.

The preceding specimens have been referred only tentatively to this species.

Series OPACAE Trelease

Quercus Pringlei von Seemen in Bot. Jahrb. **29**: 96 (1900).

NUEVO LEON: Mun. de Galeana, about Pablillo on Hacienda Pablillo, alt. 2000 to 2200 m., sparse on dry, shrub-covered hills, a low shrub, *No.* 880, June 17, 1934, *No.* 1090, July 18, 1934; Puerto de los Pastores, alt. 1500 m., rare on dry, openly wooded slopes, *No.* 995A, July 5, 1934; Mun. de Derrumbadero, hills above San Juanito, alt. 2300 m., abundant shrub on dry slopes, *No.* 2420, August 10, 1935.

Quercus Pringlei f. *dentata*, f. nov.

A typo recedit foliis circiter triente inferiore excepto dentatis dentibus incurvis mucronatis, subtus initio flavo-stellato-tomentosis demum glabratis.

NUEVO LEON: Mun. de Galeana, about Pablillo on Hacienda Pablillo, alt. 2000 m., rare shrub on dry slopes, *No. 881* (type in A. A.), June 17, 1934.

Series UNDULATAE Trelease

Quercus undulata Torr. **Vaseyana** Rydberg in Bull. N. Y. Bot. Gard. **2**: 218 (1901).

NUEVO LEON: Mun. de Rayones, Casillas, alt. 1400 m., scattered on very dry and sparsely shrub-covered slopes, *No. 2167*, July 9, 1935. TAMAULIPAS: Mun. de Villa Mainero, bajada east of the mountains and north of Villa Mainero, alt. 500 m., rare in the dense scrub thorn forest, *No. 2431*, August 14, 1935.

The specimens agree perfectly with *Q. sillae* Trelease (in Mem. Nat. Acad. Sci. **20**: 102. 1924) which is described from the vicinity of Monterrey, Nuevo Leon, a short distance to the north of the localities here cited. There is no apparent morphological distinction and no reason why *Q. undulata* should not range south over similar habitats from western Texas.

Series PRINOIDEAE Trelease

Quercus Muehlenbergii Engelm in Trans. Acad. St. Louis **3**: 391 (1877).

NUEVO LEON: Mun. de Galeana, Alamar on Hacienda Pablillo, alt. about 1900 m., large tree abundant in the densely wooded cañons, *Nos. 623 & 651*, May 30, 1934, *No. 1120*, July 21, 1934.

Series VIRENTES Trelease

Quercus fusiformis Small in Bull. Torr. Bot. Club, **28**: 357 (1901).

NUEVO LEON: Mun. de Villa Santiago, Cañon Denuncio above Rancho La Bola, alt. 750 m., abundant small tree in the more xerophytic oak wood, *No. 2013*, June 23, 1935.

Subgenus ERYTHROBALANUS Oersted

Series VIMINEAE Trelease

Quercus duraznillo Trelease in Mem. Nat. Acad. Sci. **20**: 122 (1924).

NUEVO LEON: Mun. de Galeana, Cañon San Francisco on Hacienda Pablillo, alt. 2100 m., shrub abundant on open slopes, *Nos. 369* (with definite indications of evergreen habit) & *374*, May 14, 1934, *Nos. 1289*,

1289A, & 1290, July 31, 1934; Cerro Infernillo above Cieneguillas on Hacienda Pablillo, alt. 2700 m., common in low oak wood, *No.* 845, June 17, 1934; Mun. de Derrumbadero, hills above San Juanito, alt. 2500 m., common on very dry, open slopes, *No.* 2419, August 10, 1935.

In most of the collections the leaves tend to be toothed, but not so deeply as in f. *pinetorum* Trelease (in Mem. Nat. Acad. Sci. **20**: 123. 1924). The male catkins are scarlet when they first appear. The fruit is annual, paired on a short stalk, the cup scales shiny, light brown, almost glabrous, rounded or even truncate at the apex.

Series CRASSIFOLIAE Trelease

Quercus errans Trel.¹ f. *graciliramis*, f. nov.

A typo differt ramis gracilibus 2 mm. crassis et petiolis brevioribus; praeterea foliis manifeste sempervirentibus saepe ad basin dentatis et apice minus frequenter acutis.

NUEVO LEON: Mun. de Galeana, above Pablillo on Hacienda Pablillo, alt. about 2200 m., low shrub common in the dense, low oak wood of steep slopes, *Nos.* 394 (syntype in A. A.), 395, and 401, May 14, 1934; Cañon de las Placetas above Pueblo San Francisco, alt. 2000 m., common low shrub on densely shrub-covered steep slopes, *No.* 1273 (syntype in A. A.), July 27, 1934; Cerro Potosí above Derramadero, alt. 2800 m., abundant shrub 20 to 50 cm. high on pine-covered slopes, 1 to 2 m. high in arroyos, *No.* 2224, July 20, 1935.

The specimens show distinctly the biennial fruiting habit, and in some the catkins are well preserved. The latter have not been described for the species: staminate catkins 4–7.5 cm. long, the peduncle loosely hairy, rather densely flowered above and loosely below, the stamens exserted. Pistillate catkins 10–20 mm. long, 3–5-flowered, usually only the basal one developing into a single sessile fruit.

Series ARISTATAE Trelease

Quercus Endlichiana Trelease in Mem. Nat. Acad. Sci. **20**: 141 (1924).

NUEVO LEON: Mun. de Galeana, slopes above Alamar on Hacienda Pablillo, alt. 2200 m., small tree about 7 m. tall, forming a dense wood, *Nos.* 719 & 720, June 4, 1934, *Nos.* 1159, 1161, & 1162, July 22, 1934; Mun. de Villa Santiago, Cañon Guajuco above Villa Santiago, alt. 1400 m., small tree or shrub 3 to 6 m. tall, abundant in pine and oak forest, *No.* 1330, August 12, 1934.

Quercus Endlichiana f. *minor*, f. nov.

A typo differt foliis parvis (2–3.5 × 4–6.5 cm.) leviter dentatis denti-

¹Trelease in Mem. Nat. Acad. Sci. **20**: 131 (1924).

bus setaceo-aristatis vel supra profunde incisus.

NUEVO LEON: Mun. de Galeana, slopes above Alamar on Hacienda Pablillo, alt. 2200 m., small tree about 4 m. tall, scattered in the pine and oak wood, *Nos.* 718, 728, & 729, June 4, 1934, *Nos.* 1157 (type in A. A.) & 1158, July 22, 1934; Mun. de Villa Santiago, Potrero Redondo, alt. 1400 m., moderate tree some 8 m. tall, growing on a dry, openly wooded slope, *No.* 2112, July 4, 1935, *No.* 2127, July 5, 1935.

***Quercus Endlichiana* f. *serrata*, f. nov.**

A typo differt folius profunde incisus supra acute serratis.

NUEVO LEON: Mun. de Galeana, slopes above Alamar on Hacienda Pablillo, alt. 2200 m., small tree about 4 m. tall, scattered in the pine and oak wood, *No.* 727, June 4, 1934, *No.* 1160, July 22, 1934; near Taray on Hacienda Pablillo, alt. 2200 m., moderate tree about 7 m. tall, sparse in the pine and oak wood, *Nos.* 585 & 587, May 25, 1934; Mun. de Villa Santiago, Cañon Guajuco above Villa Santiago, alt. 1400 m., moderate tree abundant in oak and pine wood, *No.* 1330A (type in A. A.), August 12, 1934; Potrero Redondo, alt. 1400 m., moderate tree about 8 m. tall, abundant in the pine and oak forests, *No.* 2126, July 5, 1935.

These specimens and those of f. *minor* grade into one another almost imperceptibly.

Certain numbers of the series representing this species (notably *Nos.* 1160, 1330 and 1330A) very pointedly indicate a close relationship to *Q. aerea* Trelease (in Mem. Nat. Acad. Sci. **20**: 135. 1924.) in general appearance, leaf form, and “. . . resiniferous beneath so as to be of the color of ‘bronzy old gold’ . . .”. The only point upon which certain of these specimens can be excluded from *Q. aerea* is that of the small round-ovoid buds of that species, and even so, certain of the less mature specimens of this series fit that description. Perhaps a comparison of this material with the types of *Q. Endlichiana* and *Q. aerea* would prove them identical. The description of the latter, however, is fragmentary, and it is to be hoped that the more fully described *Q. Endlichiana* be allowed to stand.

Series RYSOPHYLLAE Trelease

***Quercus rysophylla* Weatherby** in Proc. Amer. Acad. **45**: 423 (1910).

NUEVO LEON: Mun. de Galeana, Alamar on Hacienda Pablillo, alt. 1900 m., tall tree, 20 to 25 m., common on densely wooded cañon floors, *Nos.* 625 & 633, May 30, 1934, and *No.* 1123, July 21, 1934; Mun. de Villa Santiago, Potrero Redondo, alt. 1400 m., common on densely wooded cañon floors, 15 to 25 m. tall, *No.* 2113, July 4, 1935.

Series EUGENIAEFOLIAE Trelease

Quercus pinnativenulosa, sp. nov.

Arbor parva ramulis glabris gracilibus sulcatis, lenticellis fulvis conspicuis; gemmae subfusiformes, circa 1.5×3 mm. magnae, acutae. Folia ut videtur decidua, subcoriacea, integra, anguste ovata vel pleraque lanceolata, utrinque acuta, raro basi late cuneata, satis parva (2×5 to 3×12 cm.), supra et infra glabra et lucida, venis utrinsecus circa 18 utrinque prominulis, tenuioribus alternantibus, fere horizontaliter divergentibus, juxta marginem minute revolutum manifeste anastomosantibus; petioli supra satis applanati, circa $1 \times 3-5$ mm., apicem versus lamina decurrente alati. Amenta mascula 4-5 cm. longa, laxa; inflorescentiae femineae pleraeque biflorae, circa 5 mm. longae. Fructus biennis; cupula leviter involuta, circa 12 mm. lata et intus 6 mm. alta; glans (immatura) ovoidea, leviter sericea, dimidio immersa, circa 6×12 mm. magna.

NUEVO LEON: Mun. de Villa Santiago, Cañon Guajuco above Villa Santiago, alt. 1400 m., scattered along an arroyo in open pine and oak wood, a moderately small tree with dark gray or black bark roughly furrowed or smooth on young trees, *No. 1342* (type in A. A.), August 13, 1934.

The relationship of this species to the EUGENIAEFOLIAE is quite plain in the short petioles, the entire glabrous leaves, and the number, forking, and horizontal disposition of the veins. It is most closely related to *Q. eugeniaefolia* Liebmann (in Overs. Dansk. Vidensk. Selsk. Forhandl. 1854, p. 145) from which it is distinguished by the revolute leaf margins, less prominently winged and longer petioles, and usually less prominent veins beneath as well as by its being entirely glabrous save the staminate catkins and the cup scales. *Quercus eugeniaefolia* f. *petiolata* Trelease (in Mem. Nat. Acad. Sci. 20: 161. 1924.) is closer to *Q. pinnativenulosa* in appearance according to Trelease's illustration (pl. 316b), but the same illustration shows the former to be annual fruited which the proposed new species is definitely not. The meagerness of published descriptions makes the distinction of this species difficult even though the great discrepancy in range and the quite different appearance would lead one to expect a more ready distinction.

Series LANCEOLATAE Trelease

Quercus affinis Scheidweiler in Hort. Belg. 4: 321 (1837).

NUEVO LEON: Mun. de Galeana, Cañon San Francisco on Hacienda Pablillo, alt. 2100 m., abundant along densely wooded waterways, a slender, moderate tree, *No. 310*, May 11, 1934, *No. 1283*, July 31, 1934; Cañon Santa Barbara on Hacienda Pablillo, alt. 2200 m., abundant in

dense pine and oak wood, *No.* 579, May 25, 1934; Taray on Hacienda Pablillo, alt. 2100 m., abundant in low, dense oak wood, *No.* 1102, July 20, 1934; Cañon de las Placetas above Pueblo San Francisco, alt. 2100 m., common along a densely wooded waterway, *No.* 1232, July 25, 1934; between Puerto de Agua Sarca above Alamar on Hacienda Pablillo and Los Toros, alt. 2000 to 2500 m., *Nos.* 2422 & 2423, August 10, 1935, *No.* 2424, August 11, 1935.

Series TRIDENTES Trelease

Quercus chrysophylla Humboldt & Bonpland in Pl. Aequinoct. 2: 42 (1809).

NUEVO LEON: Mun. de Galeana, Cañon de las Placetas above Pueblo San Francisco, alt. 2200 m., rare along a wooded waterway, *No.* 1231, July 25, 1934.

Series MEXICANAE Trelease

Quercus mexicana Humb. & Bonpl. f. **Bonplandii** Trelease in Mem. Nat. Acad. Sci. 20: 174 (1924).

NUEVO LEON: Mun. de Galeana, Cañon San Francisco on Hacienda Pablillo, alt. 2100 m., abundant on openly wooded slopes, *No.* 308, May 11, 1934, *No.* 1100, July 19, 1934.

Series SALTILLENSES Trelease

Quercus flocculenta, sp. nov.

Frutex vel arbor parva ramulis 1–2 mm. crassis sulcatis stellato-incanis vel glabrescentibus; gemmae acute ovoideae, 1.5 × 2 mm. magnae. Folia decidua, firma et subcoriacea, 1–2 × 3–7 cm. magnae, anguste lanceolata vel oblonga, pleraque acuta, basi rotundata vel late subcuneata, integra vel apicem versus dentibus pluribus vel uno aristatis, margine plana, supra lucida et sparse stellato-pilosa secus costam et ad basin, subtus tomento stellato-canescente detergibili, et facie denudata minutissime bullato-granulari, venis utrinsecus 8–10, ramosis et anastomosantibus, subtus prominentibus supra vix visibilibus, reticulo venularum leviter elevato; petioli 0.5 × 4–7 mm. tomento canescente persistente sed detergibili; stipulae cito caducae. Amenta masculo circa 3 cm. longa, laxa, stellato-pilosa; amenta feminea 1–2-flora, pedunculo 1–2 × 5–10 mm. magno stellato-piloso. Fructus annuus; cupula juvenilis obconica squamis obtusis puberulis vel interdum glabris.

NUEVO LEON: Mun. de Galeana, Cañon de Cieneguillas above Pueblo San Francisco, alt. 2400 m., abundant on openly wooded slopes, shrub or small tree with low, spreading habit, *No.* 1277 (type in A. A.), July 27, 1934; slope of Cerro Potosí above Derramadero, alt. 2800 m., low tree abundant along a cut-over waterway, *No.*

2279, July 22, 1935; Mun. de Derrumbadero, above San Juanito toward Agua Sarca, *No.* 2418, August 10, 1935, *No.* 2427, August 11, 1935.

The slender petioles, raised and looping venation, and the acute, usually entire, crisped leaves of *Q. flocculenta* indicate a relationship to the SALTILLENSIS. But the rather extreme canescence of the leaves and twigs accentuates the differences between this species and those of the series SALTILLENSIS, so that one hesitates to include it therein although it fits more readily there than elsewhere.

***Quercus flocculenta* f. *incisa*, f. nov.**

A typo recedit foliis supra profunde incisus lobis aristatis, margine revoluta crispato.

NUEVO LEON: Mun. de Galeana, Cañon de Cieneguillas above Pueblo San Francisco, alt. 2400 m., common with the species, *No.* 1276 (type in A. A.), July 27, 1934; near Pablillo on Hacienda Pablillo, alt. 2200 m., common on rather dry slopes in piñon and scrub oak wood, *No.* 802, June 15, 1934.

***Quercus flocculenta* f. *oblongifolia*, f. nov.**

Ab aliis formis differt foliis oblongis 2–6 cm. longis subtus minus pubescentibus.

NUEVO LEON: Mun. de Galeana, Cañon de Cieneguillas above Pueblo San Francisco, alt. 2400 m., along arroyos in more mesophytic habitats with the species, *Nos.* 1229 (type in A. A.) & 1230, July 25, 1934, *No.* 1275, July 27, 1934; Mun. de Villa Santiago, puerto above Potrero Redondo, alt. 2300 m., abundant in the scrub oaks of a ridge top, *No.* 2129, July 7, 1935.

***Quercus galeanensis*, sp. nov.**

Frutex ramulis dense breviter stellato-pilosis, demum furfuraceis sulcatis 1–1.5 mm. crassis; gemmae acutae, 1 × 2 mm. magnae. Folia firma et crassa, oblonga vel lanceolata 0.8–1.5 × 2–3.5 cm. magna, integra vel supra profunde et setose dentata, pleraque acuta, basi cuneata vel rotundata vel cordata, margine manifeste revoluta, glabra basi costae supra et ima basi laminae ciliata exceptis, nervis utrinsecus 5–8 cm. cum intermediis, utrinque leviter elevatis, vix anastomosantibus in dentes si adsunt exeuntibus, angulo angusto divergentibus; petioli 1 × 3–5 mm. magni, glabri facie superiore excepta. Fructus annui solitarii vel bini pedunculo 2–8 mm. longo suffulti; cupula juvenilis squamis majusculis arcte appressis obtuse brunneo-acuminulatis glabris.

NUEVO LEON: Mun. de Galeana, hills about Puente de Dios near Galeana, alt. 1200 m., abundant on dry slopes, *No.* 2168 (type in A. A.), July 12, 1935.

This species seems closely related to *Quercus saltillensis* Trelease from which it may be distinguished by the usual toothing, the localization of pubescence, and glossy lower surfaces of the leaves of *Q. galeanensis*. It is a large shrub abundant on dry slopes associated with piñon, sumac, and other low oaks.

Quercus saltillensis Trelease in Mem. Nat. Acad. Sci. **20**: 183 (1924).

NUEVO LEON: Mun. de Galeana, slopes of Cerro Infernillo above Cieneguillas on Hacienda Pablillo, alt. 2700 m., common in low oak wood, *Nos.* 845 & 848, June 17, 1934; below Cieneguillas on Hacienda Pablillo, alt. 2200 m., sparse in shrub zones on dry hillsides, *No.* 887, June 17, 1934; Cañon San Francisco on Hacienda Pablillo, common on open, shrub-covered hills, *No.* 1290, July 31, 1934.

Series ACUTIFOLIAE Trelease

Quercus alamarensis, sp. nov.

Arbor parva, glabra ramulis gracilibus 1.5–2 mm. crassis sulcatis conspicue lenticellatis; gemmae ovoideae, obtusae, 1.5 × 2 mm. magnae, squamis obscure brunneis leviter ciliolatis. Folia decidua, anguste lanceolata, 2–3 × 8–12 cm. magna, integra vel raro setis una vel duobus marginalibus instructa, longe acuta, basi rotundata vel late cuneata, supra lucide glauco-viridia, subtus cuprea, nervis utrinsecus circiter 10 ramosissimis et anastomosantibus, ut costa utrinque elevatis; petioli 1 × 15–20 mm. Amenta feminea biflora pedunculo 3–6 mm. longo; squamae cupula juvenilis squamis leviter verruculosis. Fructus annuus.

NUEVO LEON: Mun. de Galeana, Alamar on Hacienda Pablillo, alt. 2000 m., rare in open wood along arroyos, *No.* 613 (type in A. A.), May 29, 1934.

Small tree with roughly furrowed, black bark and a moderately branched habit. It is only by the nature of the veins that this tree can be entirely excluded from the species *Quercus Canbyi* Trel., although its leaf form would make it quite a strange phase of that species.

Quercus Canbyi Trelease in Mem. Nat. Acad. Sci. **20**: 188 (1924).

NUEVO LEON: Mun. de Galeana, Alamar on Hacienda Pablillo, alt. 1900 to 2100 m., common in wooded cañons, *Nos.* 615 & 616, May 29, 1934, *No.* 1177, July 22, 1934, *Nos.* 1203 & 1225, July 23, 1934; Puerto de los Pastores, alt. 1500 m., scattered on open slopes, *Nos.* 1007 & 1008, July 5, 1934; Cañon Santa Barbara on Hacienda Pablillo, alt. 1900 m., abundant in a densely wooded waterway, *No.* 1094, July 19, 1934; Mun. de Monterrey, Cañon Diente, alt. 800 m., abundant on

openly wooded, dry slopes, *No.* 1305, August 8, 1934; Mun. de Villa Santiago, Cañon Marisio Arriba above Las Adjuntas, alt. 1300 m., abundant on drier slopes, *No.* 2051, June 25, 1935; Potrero Redondo, alt. 1500 m., common on drier slopes, *Nos.* 2090 & 2100, July 4, 1935.

The forms of this species are many of them doubtless only ecological phases. They are significant taxonomically only because of the danger of their being regarded as distinct species.

***Quercus Canbyi* f. *attenuata*, f. nov.**

A typo differt omnibus partibus diminutis; ramulis 1–2 mm. crassis, gemmis 2 mm. longis, foliis 1–1.5 × 5–7 cm. magnis, cupula 9–10 mm. diam.; arbor parva.

NUEVO LEON: Mun. de Villa Santiago, Cañon Guajuco above Villa Santiago, alt. 1300 m., scattered with the species on dry slopes, *No.* 1347 (type in A. A.), August 15, 1934; Mun. de Galeana, Puerto de los Pastores near Galeana, alt. 1500 m., sparse on dry slopes, *No.* 1010, July 5, 1934.

***Quercus Canbyi* f. *Karwinskii* (Trel.), comb. nov.**

Quercus Karwinskii Trelease in Mem. Nat. Acad. Sci. 20: 188 (1924).

NUEVO LEON: Mun. de Galeana, Puerto de los Pastores, alt. 1500 m., sparse with the species on dry, open wooded slopes, *No.* 1006, July 5, 1934.

Specimens have been collected which approach variously this proposed species of Trelease, and the one collection which seems undoubtedly to fit here shows by its relation to intergrades that it cannot be held distinct from *Q. Canbyi*. The chief character upon which *Q. Karwinskii* is distinguished in Trelease's key, that of cup scales not canescent, is encountered in various forms as well as typical *Q. Canbyi*. Notable intergrades in these collections are *Q. Canbyi* f. *setacea* and *No.* 999 of f. *subovatifolia*.

***Quercus Canbyi* f. *pedunculata*, f. nov.**

Differt a forma *attenuata* pedunculis 5–8 mm. longis.

NUEVO LEON: Mun. de Galeana, Puerto de los Pastores, alt. 1500 m., rare with the species, *No.* 1009 (type in A. A.), July 5, 1934.

***Quercus Canbyi* f. *setacea*, f. nov.**

A typo differt foliis lobis multo longioribus ad 15 mm. setaceo-aristatis aristis 5–6 mm. longis, apice longe attenuatis et plerumque integris.

NUEVO LEON: Mun. de Galeana, Puerto de los Pastores, alt. 1500 m., rare with the species, *No.* 1011 (type in A. A.), July 5, 1934.

***Quercus Canbyi* f. *subovatifolia*, f. nov.**

Differt foliis tenuioribus, ad 4.5 × 11 cm. magnis, basi saepe obtuse subcuneatis vel rotundatis.

NUEVO LEON: Mun. de Galeana, Puerto de los Pastores, alt. 1500 m., scattered on dry slopes with the species, *No. 999*, July 5, 1934; Alamar on Hacienda Pablillo, alt. 2000 m., common along densely wooded waterways, *No. 1203A*, July 23, 1934; Mun. de Villa Santiago, Cañon Guajuco above Villa Santiago, alt. 1200 m., scattered with the species on closely wooded slopes, *No. 1346*, August 15, 1934.

This form cannot be satisfactorily distinguished from the species, but its broad leaves together with minor differences, such as leaf texture very fine, give it such an aberrant appearance that only the many intergrades restrain one from regarding some of the specimens as distinct species. Leaves as large as 4.5×11 cm., the bases often obtusely subcuneate to broadly rounded. This form arises most commonly under conditions of shade and abundant moisture. It is an artificial group, and no one of the specimens cited may be designated as a type.

Quercus Sartorii Liebmann in Overs. Dansk. Vidensk. Selsk. Forhandl. 1845, p. 177.

NUEVO LEON: Mun. de Villa Santiago, Potrero Redondo, alt. 1500 m., sparsely scattered in open oak wood on rather dry, gentle slopes, low tree, *No. 2123*, July 5, 1935.

Quercus cupreata¹ f. *brachystachys*, f. nov.

A typo differt lenticellis prominentibus, foliis basi rotundatis vel subcuneatis, amentis femineis 5 mm. longis vel brevioribus (in typo 10–20 mm. longis).

NUEVO LEON: Mun. de Villa Santiago, Cañon Guajuco above Villa Santiago, alt. 1400 m., common in dense oak wood, *No. 1327* (type in A. A.), August 12, 1934; Cañon Denuncio above Rancho La Bola, alt. 900 m., sparse along a wooded waterway, *No. 2011*, June 22, 1935.

The specimens of this form bear mature fruits which are here described because those of the species are yet unknown: cups moderate (12–14 mm.), shallow (5 mm.), moderately inrolled, scales light brown, dark tipped, elongated and narrowly rounded, somewhat scurfy and ciliate; acorns small (10–11 mm. broad, 7–9 mm. long), hemispherical (flat at the base), obtusely conic above, depressed at the apex, silky, minutely striate.

Quercus cupreata f. *serrata* Trelease & Mueller in Bull. Torr. Bot. Club, **63**: 153 (1936).

NUEVO LEON: Mun. de Villa Santiago, Potrero Redondo, alt. 1400 m., abundant on densely wooded cañon walls, *Nos. 2078 & 2079*, July 3, 1935, *No. 2102*, July 4, 1935.

¹Trelease & Mueller in Bull. Torr. Bot. Club, **63**: 152 (1936).

***Quercus graciliramis*, sp. nov.**

Arbor glabra domatiis inconspicuis interdum in foliis repertis exceptis, ramulis 2–2.5 mm. crassis, manifeste sulcatis lenticellis parvis instructis; gemmae acutae, conicae, 1.5 × 2.5 mm. magnae. Folia decidua, lanceolata vel anguste ovata, 3.5–7 × 8–13 cm. magna, basi subcuneata, leviter serrata ad profunde incisa lobis in setas tenues 3–5 mm. excurrentibus, sinus levibus vel profundis rotundatis, supra opaca, infra lucida et cuprea, margine plana nervis utrinsecus 4 vel 5 ut venulis leviter prominentibus; petioli supra applanati, 1 × 20–30 mm. Amenta feminea 5–10 mm. longa, 2–3-flora, pedunculo 1.5 × 5–7 mm. Fructus biennis; cupula juvenilis turbinata, margine leviter involuta, squamis tenuibus planis anguste rotundatis ciliatis canescentibus deteris pallide brunneis; glans juvenilis leviter stellato-puberula ad apicem applanatam et rotundatam.

NUEVO LEON: Mun. de Galeana, Alamar on Hacienda Pablillo, alt. 1900 to 2100 m., abundant along densely wooded waterways, *No. 1106* (type in A. A.), July 20, 1934, *No. 617*, May 29, 1934, *No. 1124*, July 21, 1934, *No. 1202*, July 23, 1934; Taray on Hacienda Pablillo, alt. 2100 m., common along waterways, *No. 1224*, July 23, 1934.

Moderate tree with long graceful branches and roughly furrowed, dark gray or black bark. The affinities of this species for *Quercus runcinatifolia* Trelease & Mueller (in Bull. Torr. Bot. Club, **63**: 153. 1936) as regards leaf characters and for other species of the section in fruit characters are no more marked than its apparently close relationship to *Q. albocinta* Trelease (in Mem. Nat. Acad. Sci. **20**: 193. 1924) upon which is based the series ALBOCINTAE Trel. Since the fruits of *Q. albocinta* are unknown, any comparison (or distinction) must be based upon leaf characters. In this regard the typical form of *Q. graciliramis* closely approximates *Q. albocinta*, and there comes to mind the suggestion that the series ALBOCINTAE may be more closely related to certain species of the ACUTIFOLIAE than are some of the species of the latter to one another. The only characters upon which there can be based any great distinction between *Q. albocinta* and the species of ACUTIFOLIAE are that in the former the veins invariably pass into the lobes, and that the leaf margins are broadly crisped. These characters may be seen as tendencies in *Q. graciliramis* and *Q. runcinatifolia*, and in the latter the white veins of *Q. albocinta* are quite common. *Quercus graciliramis* is readily distinguished from *Q. runcinatifolia*, to which it is closely related, by the fine texture of its leaves and by its prominent lenticels. When the fruits of *Q. runcinatifolia* become known, there will probably be more readily describable differences.

Quercus tenuiloba, sp. nov.

Arbor alta, glabra domatiis inconspicuis interdum in foliis repertis exceptis, ramulis 3 mm. crassis sulcatis obscure rubro-brunneis lenticellis prominentibus demum canescentibus lenticellis minus conspicuis instructis; gemmae conicae, 2×3 mm. magnae, acutae, apice pubescentes, squamis obscure brunneis ciliatis. Folia decidua, anguste attenuato-lanceolata, raro latiora, $3.5-5.5 \times 12-17$ cm. magna, basi quadrato-rotundata vel leviter cordata, pleraque supra leviter incisa sinibus rotundatis, lobis brevibus in setas 4-8 mm. longas exeuntibus, lobo terminali plerumque elongato-acuta, margine cartilagineo leviter revoluta, supra opaca, subtus lucida, cuprea, nervis utrinsecus 10-12 supra impressis subtus prominentibus, trabeculis satis conspicuis conjunctis, ramosis sed vix anastomosantibus; petioli supra appianati et leviter alati, $1.5 \times 10-22$ mm., plerique 20-22 mm. Amenta feminea biflora, circa 8 mm. longa. Fructus biennis; cupula juvenilis rotundata squamis tenuibus appressis canescentibus tomento deterso pallide brunneis.

NUEVO LEON: Mun. de Galeana, Alamar on Hacienda Pablillo, alt. 1900 m., sparse in densely wooded arroyos, *No. 1125* (type in A. A.), July 21, 1934, *No. 652*, May 30, 1934, *No. 1146*, July 21, 1934; Mun. de Villa Santiago, Cañon Marisio Arriba, above Las Adjuntas, alt. 1400 m., sparse in densely wooded waterways, *No. 2045*, June 25, 1935.

Large, tall tree with roughly furrowed, black bark, growing sparsely on very moist and densely wooded cañon floors. *Quercus tenuiloba* is quite distinct from other species of the series ACUTIFOLIAE, but it is apparently rather closely related to *Q. Grahami* Bentham (Plant. Hartweg. 57. 1840) and *Q. xalapensis* Humboldt & Bonpland (Pl. Aequinoct. 2: 24. 1809) from both of which it may be distinguished by its veins impressed above and its squarely rounded leaf bases.

Quercus tenuiloba f. *gracilis*, f. nov.

A typo differt ramulis gracilibus 1.5-2 mm. crassis, foliis valde angustatis basi truncatis vel obtuse cuneatis; petiolis 3-4 mm. longis.

NUEVO LEON: Mun. de Villa Santiago, Cañon Marisio Arriba, above Las Adjuntas, alt. 1400 m., moderate, slender tree rare along densely wooded waterways, *No. 2048* (type in A. A.), June 25, 1935.

Quercus tenuiloba f. *hirsuta*, f. nov.

A typo differt ramulis hornotinis pilosis, annotinis furfuraceis, foliis subtus ad costam nervosque et supra ad basin costae stellato-pilosis; petiolis 6-10 mm. longis.

NUEVO LEON: Mun. de Villa Santiago, Potrero Redondo, alt. 1500

m., moderate, spreading tree sparse on openly wooded slopes, *No.* 2122 (type in A. A.), July 5, 1935.

Quercus vexans Trelease in Mem. Nat. Acad. Sci. **20**: 190 (1924).

NUEVO LEON: Mun. de Villa Santiago, Cañon Guajuco above Villa Santiago, alt. 1500 m., abundant in dense oak wood on steep slopes, *Nos.* 1326 & 1332, August 12, 1934; Potrero Redondo, alt. 1400 to 1800 m., abundant constituent of dense oak wood on broad slopes, *No.* 2121, July 5, 1935, *No.* 2130, July 7, 1935.

No. 1332 exhibits what is apparently secondary growth giving the appearance of biennial fruit and evergreen foliage. The general fruiting habit, however, does not warrant any such conclusion.

DEPARTMENT OF BOTANY,
UNIVERSITY OF ILLINOIS,
URBANA, ILLINOIS.